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HIGH POWER ULTRASONIC TRANSDUCERS
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Amended first complete paragraph beginning on page 6, line 11:

C1

High power ultrasonic transducers and ultra-high power ultrasonic transducers are disclosed. The transducers each include a housing having a predetermined geometry and one or more motor assemblies. Each motor assembly has one or more active elements made from a smart material, such as a magnetostrictive material. Each motor assembly also is connected to means for producing an electromagnetic field that extends through at least a portion of the active element. Each active element is changeable between a first shape when in the absence of an electromagnetic field or in a low magnetic field and a second or elongated shape when in the presence of the electromagnetic field or in a higher magnetic field. Means for providing an electrical signal to the means for producing an electromagnetic field is included. An acoustic element is connected to the transducer for channeling ultrasonic energy to perform work.

Amended last paragraph beginning on page 30, line 30:

C2 cnt.

In designing a suitable master wave-guide 1204, it is important that the acoustic impedance characteristics of the mode stabilizer 1204a be close to both that of the drive rod 1342 and the output amplifier 1204b. This is achieved with the use of a high speed of sound material noted above for the mode stabilizer 1204a and a titanium material for the output amplifier 1204b. Unlike current wave-guides made from just one type of material that has a speed of sound of around 5000 meters per second and a Poisson's ratio of about 0.3, (e.g., aluminum alloys, titanium, titanium alloys and steel), use of a high speed of sound/low Poisson's ratio material for the novel mode stabilizer 1204a of the present invention prevents a "neck down" effect from occurring. Specifically, if a conventional material were used for the mode stabilizer 1204a, the face of the mode stabilizer 1204a to which the sub-motors 1341 are attached would bow and flex from a concave to a convex shape, i.e., the master wave-guide 1204 would become narrower in the center during operation. This would cause the sub-motors 1341 to vibrate sideways at very high acceleration levels, leading to probable early failure of the transducer 1221. By using a material with an adequately low Poisson's ratio and high speed of sound for the mode stabilizer 1204a, the transverse direction is substantially insensitive to motion occurring in the axial

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direction. As a result, each sub-motor 1341 moves primarily in one direction, and does not wobble from side to side.

Amended last paragraph beginning on page 48, line 27:

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As with the single motor embodiment, each drive rod 1342 is changeable between a first shape in the absence of a magnetic field or a low magnetic field and a second shape when in the presence of a magnetic field or in a higher magnetic field. In one embodiment, the magnetic domains present in each drive rod 1342, such as with the use of giant magnetostrictive materials as the drive rod material, align around the longitudinal axis 1322 when a magnetic field parallel to the longitudinal axis 1322 is applied to the drive rods 1342. This alignment of the magnetic domains causes the drive rods 1342 to elongate. A sinusoidal input signal is provided to the drive coil 1351 for producing a changing electromagnetic field which has the same frequency as the input signal, and extends through each drive rod 1342. Specifically, the input passes through the foil in the drive coil 1351 and causes an alternating electromagnetic field to be generated by the drive coil 1351 through each drive rod 1342 as discussed herein.